BANGALORE WATER SUPPLY
AND SEWERAGE BOARD
CAUVERY BHAVAN, KEMPEGOWDA ROAD
BANGALORE - 560 009

Telephone: 91-80-22945108 Fax: 91-80-22945108

Through Karnataka Public Procurement Portal

KARNATAKA WATER SECURITY AND DISASTER RESILIENCE PROGRAM (KWSDRP)

TENDER FOR THE WORK OF

DESIGN, ENGINEERING, CONSTRUCTION AND COMMISSIONING OF WASTEWATER TREATMENT PLANTS WITH TERTIARY TREATMENT FACILITY AND INTERMEDIATE SEWAGE PUMPING STATION ALONG WITH OPERATION & MAINTENANCE THEREOF FOR TEN YEARS FOR BYATARAYANAPURA ZONE (DBO MODE) IN 110 VILLAGE AREAS (Phase II) UNDER KARNATAKA WATER SECURITY AND DISASTER RESILIENCE PROGRAM (KWSDRP) – (Contract Package No. BWSSB CE-P/KWSDRP/WBS-II-A)

VOLUME 4 of 4

(DRAWINGS)

APRIL – 2025

Office of the *Chief Engineer (Project)*
BANGALORE WATER SUPPLY & SEWERAGE BOARD
3rd Floor, Cauvery Bhavan,
K.G. Road,
Bangalore -560 009
www.kppp.karnataka.gov.in

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VOLUME-4

WBS-2A

DRAWINGS

List of Drawings of WBS-2A		
Sl. No.	**Drawing No:**	**List of drawings**
1	TN-KWSDRP-WBS2A-CV-3000	Proposed Waste Water Treatment Plants (WwTPs)
2	TN-KWSDRP-WBS2A-CV-3007	Topographical Survey Layout for Proposed WwTP 15MLD at Kogilu Bangalore
3	TN-KWSDRP-WBS2A-CV-3008	Topographical Survey for Proposed at Bellahali ISPS Bangalore
4	TN-KWSDRP-WBS2A-CV-3051	15MLD WWTP at Kogilu Process Flow Diagram
5	TN-KWSDRP-WBS2A-EL-4001	Electrical Single Line Diagram for Electrical works at Waste Water Treatment Plant (WWTP) with Reuse-Typical
6	TN-KWSDRP-WBS2A-EL-4002	Electrical Single Line Diagram for Electrical works at ISPS (Typical) SH 01 of 02
7	TN-KWSDRP-WBS2A-EL-4002	Electrical Single Line Diagram for Electrical works at ISPS (Typical) SH 02 of 02
8	TN-KWSDRP-WBS2A-IC-5002	SCADA Control system Architecture Drawing for WwTP at Kogilu
9	TN-KWSDRP-WBS2A-IC-5010	Control system Architecture Drawing for Intermediate Sewage Pumping Station (ISPS) at Bellalahalli/Harohalli
10	TN-KWSDRP-WBS2A-HYD-6011	Typical Hydraulic Flow Diagram for Intermediate Sewage Pumping Station

TITLE: PROPOSED WASTE WATER TREATMENT PLANTS (WWTPS)

DWG NO: TN-KWSDRP-WBS2A-CV-3000

NORTH

PROPOSED 15MLD WwTP AT KOGILU

PROPOSED 2MLD ISPS AT BELLALAHALLI

Iblur Proposed 5MLD WwTP

CORE AREA

HEBBAL VALLEY

HEBBAL MINOR VALLEY

VRISHBHAVATHY VALLEY

CHALLAGATTA VALLEY

ARKAVATHI VALLEY

KATHRIGUPPE VALLEY

TAVARAKERE VALLEY

YELAHANKA CMC

BYTRAYANAPURA CMC

DASARAHALLI CMC

KENGERI TMC

R.R NAGAR CMC

BOMMANAHALLI CMC

K.R PURAM CMC

MAHADEVPURA CMC

HAROHALLI, GOVINDAPURA, VASUDEVPURA, ANANTHAPURA, KENCHANAHALLI, MANCHANAHALLI, KATTIGENAHALLI, DODDABETTAHALLI, CHIKKABETTAHALLI, BELLAHALLI, THIRUMANAHALLI, CHOKKANAHALLI, ABBIGERE, CHIKKALASANDRA, MYADARAHALLI, SIDDENEHALLI, SHETTYHALLI, From Byrathi WTP, N.NAGENAHALLI, KOTHANUR, KOTHANUR NARAYANAPURA, RACHENAHALLI, DHANISANDRA, BYRATHI, KYLASANAHALLI, BILISHIVALLI, DASARAHALLI, KEDDALAHALLI, S. CHANNASANDRA, KORAMAVU AGRAHARA, KALKERE, VARANASI, CHALLAKERE, KORAMAVU, DODDABIDARAKALLU, KARIVOBANAHALLI, HANDRAHALLI, LINGADENAHALLI, HOSAHALLI, HEROHALLI, GIDAKONDANAHALLI, ULLALA, SONNANAHALLI, AREHALLI, VADDARAPALYA, UTTARAHALLI, SUBRAMANYAPURA, GANAKAL, VASANTHPUR, TURAHALLI, GUBBULU, DODDAKALLASANDRA, HEMIGEPURA, SOMAPURA, HEMIGEPURA (P), MANAVARTHIKAVU, VARAHASANDRA, LINGADEERANAHALLI, HOSAHALLI, MADHUVANA HALLI, HALAGHATTAPURA, VAJRA HALLI, THIPPASANDRA, ALAHALLI, ANJANAPURA, KEMBETHAHALLI, PILLAGANAHALLI, GOLAHALLI, KALENA AGRAHARA, GOTTIGERE, KAMMANAHALLI, CHANDRAPPA SARAPURA, YELLANAHALLI, BASAVANAPURA, BEGUR, BELLANDUR, KARIYAMMANA AGRAHARA, DEVARA BEESANAHALLI, AMBALIPURA, DODDA KANNALLI, KASAVANAHALLI, SUNNASANDRA, CHIKKA BELLANDUR, HARALURU, KUDLU, PARAPPANAEAGRAHARA, NAGANATHAPURA, BASAPURA, CHIKKATHOGURU, BHARTHENAGRAHARA, BELATHUR & KUMBENA AGRAHARA, KADUGODI PLANTATION, CHANNASANDRA, NAGONDANAHALLI, NAGADUR, KANEKANDYA, SORAHUNISE, TUBARAHALLI, SIDDAPURA, RAMAGONDANAHALLI, BELLANDUR LAKE, BALAGERE, PANATHUR, VARTHUR, GUNJUR, BHOGANAHALLI, DODDA KANNALLI, SARJAPUR ROAD, PERIPHERAL RING ROAD, TO HOSUR, TO KR PURAM, TO ELECTRONIC CITY

NORTH

LEGEND:-

- 110 VILLAGES
- CMC AREA
- TMC AREA
- CORE AREA
- MAJOR ROAD
- VILLAGE BOUNDARY
- RAILWAY TRACK

PROPOSED STPs LOCATIONS UNDER WORLD BANK SCHEME

PROPOSED WwTP

Sl. No	WwTP Name	Capacity (MLD)	Geo Co-Ordinates
1	Kogilu	15.0	13.080369°, 77.531141°

ISSUE	DATE	DESCRIPTION	BY	CHECKED
P0	02/04/2025	FOR TENDER PURPOSE	SGS	MKV

FOR TENDER PURPOSE ONLY

BANGALORE WATER SUPPLY AND SEWERAGE BOARD
KARNATAKA WATER SECURITY AND DISASTER RESILIENCE PROGRAMME (KWSDRP) FUNDED BY WORLD BANK

DESIGN, ENGINEERING, CONSTRUCTION AND COMMISSIONING OF WASTEWATER TREATMENT PLANT WITH TERTIARY TREATMENT FACILITY AND INTERMEDIATE SEWAGE PUMPING STATION ALONG WITH OPERATION & MAINTENANCE THEREOF FOR TEN YEARS FOR BYTARAYANAPURA ZONE (DBO Mode) IN 110 VILLAGE AREAS (PHASE II) UNDER KARNATAKA WATER SECURITY AND DISASTER RESILIENCE PROGRAM (KWSDRP) - (CONTRACT PACKAGE NO. BWSSB CE-P/KWSDRP/WBS-2-A)

TITLE: Proposed Waste Water Treatment Plants (WwTPs)

PROJECT MANAGEMENT CONSULTANTS:
TATA CONSULTING ENGINEERS LTD
NJS ENGINEERS INDIA PVT. LTD(JV)

DESIGNED: MKV	APPROVED	DATE: (TO ISSUE) 02/04/2025
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FILE NAME: TN-KWSDRP-WBS2A-CV-3000.dwg		A1 SIZE

DWG NO: TN-KWSDRP-WBS2A-CV-3007

TITLE: TOPOGRAPHICAL SURVEY LAYOUT FOR PROPOSED WWTP 15MLD AT KOGILU BANGALORE

NORTH

E784100 E784150 E784200 E784250 E784300 E784350

N1450950 N1450900 N1450850 N1450800 N1450750

PROPOSED GABBION WITH CHAIN LINK FENCING

PROPOSED RCC PRECAST COMPOUND WALL

Mud Road

Fence

Covered Drain

Shed

Proposed Area for 15MLD WwTP

PROPOSED GABBION WITH CHAIN LINK FENCING

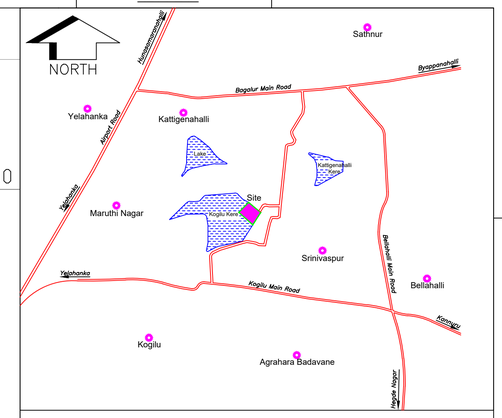
PROPOSED RCC PRECAST COMPOUND WALL

Mud Road

ENTRY

HFL:897.00

KEY PLAN



NOTES:

1. ALL LEVELS ARE IN METERS,UNLESS OTHER WISE MENTIONED.
2. ALL LEVELS ARE CARRIED FROM GTS BM (RL 903.20 M) LOCATED IN TRINITY CHURCH AT TRINITY CIRCLE.

LEGEND

DESCRIPTION	TYPE
ASPHALT ROAD	
COVERED DRAIN	
OPEN/LINED DRAIN	
COMPOUND WALL	
FENCE	
CHAMBER	CH
TELEPHONE POLE	
ELECTRIC BOX	E
POWER LINE & POLE	
TRANSFORMER	
TREES & TREE GIRTH	T-11.1m
BUILDING	
PRECAST COMPOUND WALL	
PROPOSED CHAIN LINK FENCING WITH GABBION	
CONTOUR WITH CONT RL	
SPOT LEVELS	881.437
DRAIN CENTER/INVERT LEVELS	883.577
TRAVERSE POINTS	B1
BENCH MARKS	RBM1

AREA STATEMENT

Area in Sqmt	Area in Acre
11752.62	2.90

CONTRACTOR SHALL PROPOSE THE COMPLETE WWTP UNITS INCLUDING TSPS WITHIN THE AREA SHOWN IN HATCHED PORTION ACCORDINGLY MAXIMUM AREA AVAILABILITY IS ONLY 2.90 ACRES

PROPOSED AREA FOR WWTP

ISSUE	DATE	DESCRIPTION	BY	CHECKED	APPD.
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TITLE:

TOPOGRAPHICAL SURVEY LAYOUT FOR PROPOSED WwTP 15MLD AT KOGILU BANGALORE

PROJECT MANAGEMENT CONSULTANTS:
TATA CONSULTING ENGINEERS LTD
NJS ENGINEERS INDIA PVT. LTD(JV)

DESIGNED: MKV	APPROVED	DATE: (TO ISSUE) 02/04/2025
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FILE NAME: 4. TN-KWSDRP-WBS2A-CV-3007.dwg A1 SIZE

TITLE: TOPOGRAPHICAL SURVEY FOR PROPOSED AT BELLAHALI ISPS BANGALORE

DWG NO: TN-KWSDRP-WBS2A-CV-3008

NORTH

E786750

E786800

N1450000

N1449950

PROPOSED SITE BOUNDARY FOR ISPS

RCC PRECAST COMPOUND WALL (ALL SIDES)

ENTRY

Buildings

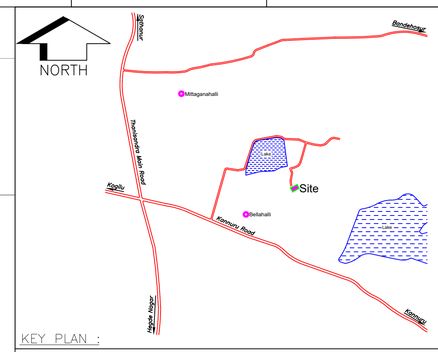
Stream

Temporary Sheds

Temporary Shed

Pond

HFL:896.50



KEY PLAN :

NOTE:-

1. ALL DIMENSIONS ARE IN Mts. UNLESS OTHERWISE MENTIONED.
2. ALL LEVELS ARE CARRIED FROM GTS BM (RL 903.20 M) LOCATED IN TRINITY CHURCH AT TRINITY CIRCLE.

LEGEND

DESCRIPTION	TYPE
ASPHALT ROAD	
COVERED DRAIN	
OPEN/LINED DRAIN	
COMPOUND WALL	
FENCE	
CHAMBER	CH
TELEPHONE POLE	
ELECTRIC BOX	E
POWER LINE & POLE	
TRANSFORMER	
TREES & TREE GIRTH	
BUILDING	
BOUNDARY LINE	
CONTOUR WITH CONT RL	
SPOT LEVELS	881.437
DRAIN CENTER/INVERT LEVELS	883.577
TRAVERSE POINTS	B1
BENCH MARKS	RBM1

TOTAL AREA FOR SITE

Area in Sqmt	Area in Acre
613.41	0.151

CONTRACTOR SHALL PROPOSE THE COMPLETE ISPS UNITS WITHIN THE AREA SHOWN IN HATCHED PORTION. ACCORDINGLY MAXIMUM AREA AVAILABILITY IS ONLY 0.151 ACRES

PROPOSED AREA FOR ISPS

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TITLE: TOPOGRAPHICAL SURVEY FOR PROPOSED AT BELLAHALI ISPS BANGALORE

PROJECT MANAGEMENT CONSULTANTS:
TATA CONSULTING ENGINEERS LTD
NJS ENGINEERS INDIA PVT. LTD(JV)

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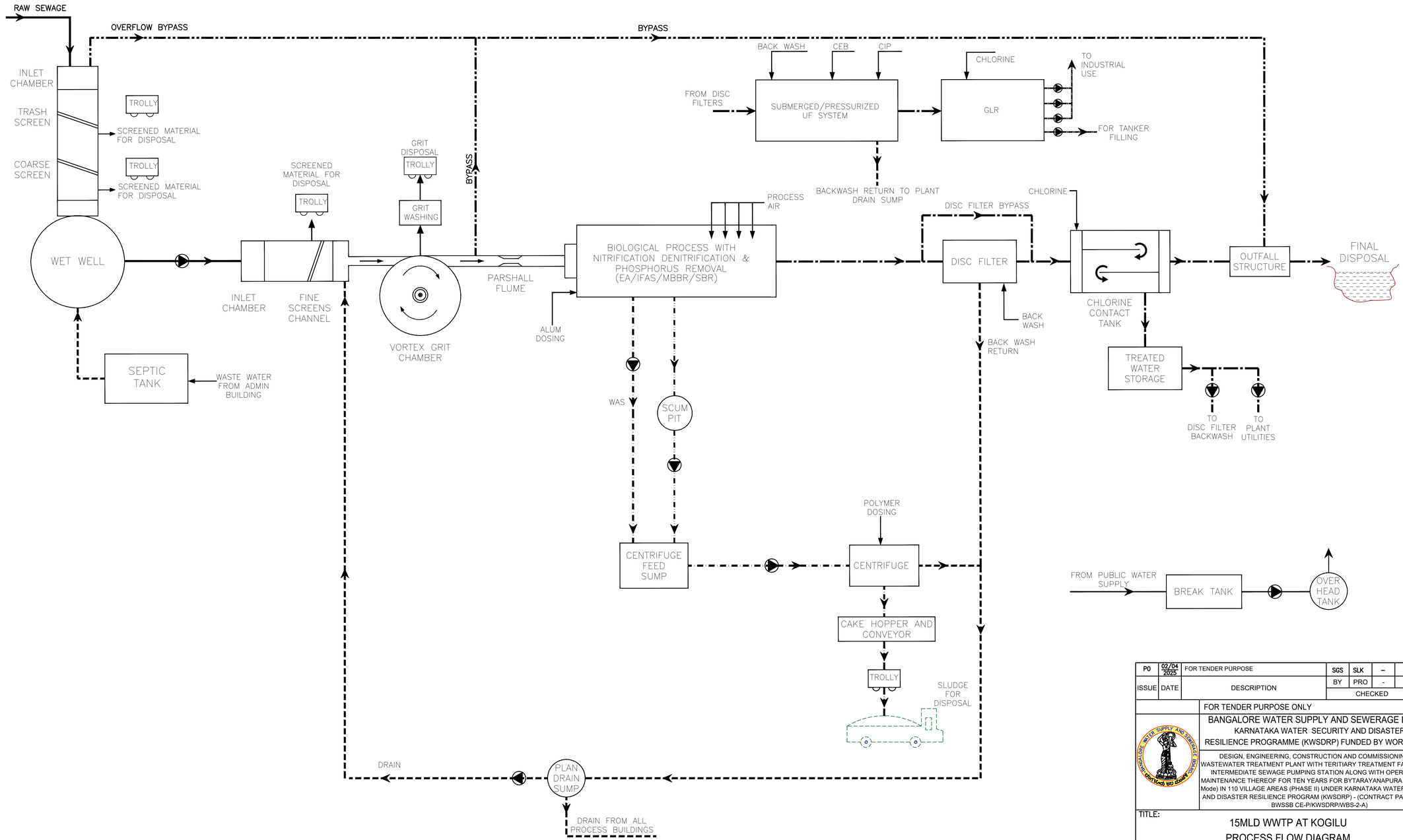
FILE NAME: 5. TN–KWSDRP–WBS2A–CV–3008.dwg		A1 SIZE

TITLE: 15MLD WWTP AT KOGILU
PROCESS FLOW DIAGRAM

DWG NO: TN-KWSDRP-WBS2A-CV-3051



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			CHECKED				

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BANGALORE WATER SUPPLY AND SEWERAGE BOARD
KARNATAKA WATER SECURITY AND DISASTER RESILIENCE PROGRAMME (KWSDRP) FUNDED BY WORLD BANK

DESIGN, ENGINEERING, CONSTRUCTION AND COMMISSIONING OF WASTEWATER TREATMENT PLANT WITH TERITIARY TREATMENT FACILITY AND INTERMEDIATE SEWAGE PUMPING STATION ALONG WITH OPERATION & MAINTENANCE THEREOF FOR TEN YEARS FOR BYTARAYANAPURA ZONE (DBO Mode) IN 110 VILLAGE AREAS (PHASE II) UNDER KARNATAKA WATER SECURITY AND DISASTER RESILIENCE PROGRAM (KWSDRP) - (CONTRACT PACKAGE NO. BWSSB CE-P/KWSDRP/WBS-2-A)

TITLE:
15MLD WWTP AT KOGILU
PROCESS FLOW DIAGRAM

PROJECT MANAGEMENT CONSULTANTS:
TATA CONSULTING ENGINEERS LTD
NJS ENGINEERS INDIA PVT. LTD(JV)

DESIGNED: SLK	APPROVED	DATE: (TO ISSUE) 02/04/2025
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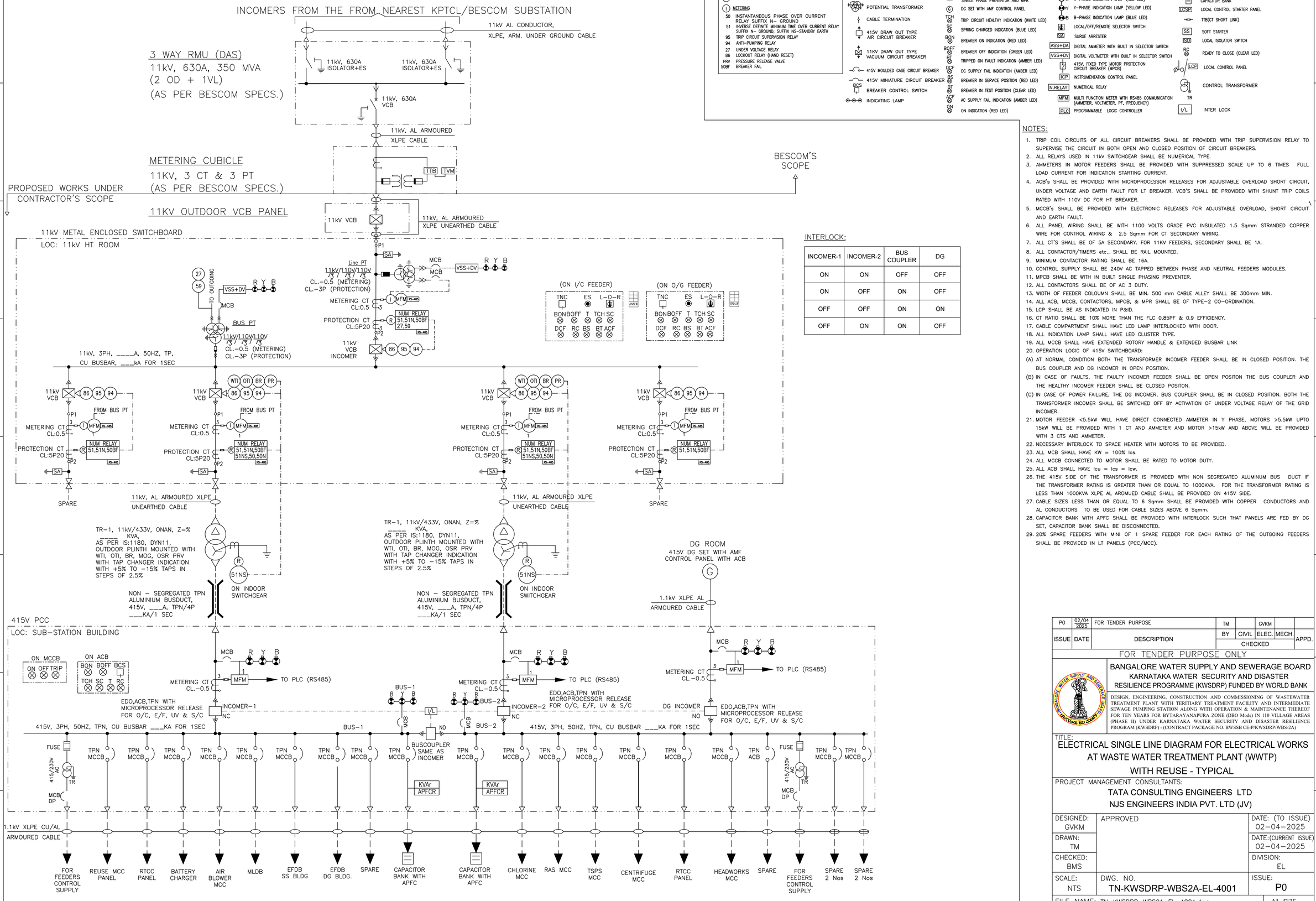
SCALE: NTS	DWG. NO. TN-KWSDRP-WBS2A-CV-3051	ISSUE: P0
FILE NAME: TN-KWSDRP-WBS2A-CV-3051.dwg		A1 SIZE

TITLE: ELECTRICAL SINGLE LINE DIAGRAM FOR ELECTRICAL WORKS AT WASTE WATER TREATMENT PLANT (WWTP) WITH REUSE - TYPICAL

DWG NO: TN-KWSDRP-WBS2A-EL-4001



LEGENDS:–

(R) RELAYING

(I) METERING

50 INSTANTANEOUS PHASE OVER CURRENT RELAY SUFFIX N– GROUND
51 INVERSE DEFINITE MINIMUM TIME OVER CURRENT RELAY SUFFIX N– GROUND, SUFFIX NS–STANDBY EARTH
95 TRIP CIRCUIT SUPERVISION RELAY
94 ANTI–PUMPING RELAY
27 UNDER VOLTAGE RELAY
86 LOCKOUT RELAY (HAND RESET)
PRV PRESSURE RELEASE VALVE
50BF BREAKER FAIL

3–PH DISTRIBUTION TRANSFORMER
CURRENT TRANSFORMER
POTENTIAL TRANSFORMER
CABLE TERMINATION
415V DRAW OUT TYPE AIR CIRCUIT BREAKER
11KV DRAW OUT TYPE VACUUM CIRCUIT BREAKER
415V MOULDED CASE CIRCUIT BREAKER
415V MINIATURE CIRCUIT BREAKER
BCS BREAKER CONTROL SWITCH
INDICATING LAMP

M MOTOR
STAR–DELTA STARTERS WITH SINGLE PHASE PREVENTOR AND MPR
DIRECT ONLINE STARTERS WITH SINGLE PHASE PREVENTOR AND MPR
DG SET WITH AMF CONTROL PANEL
TCH TRIP CIRCUIT HEALTHY INDICATION (WHITE LED)
SC SPRING CHARGED INDICATION (BLUE LED)
BON BREAKER ON INDICATION (RED LED)
BOFF BREAKER OFF INDICATION (GREEN LED)
TT TRIPPED ON FAULT INDICATION (AMBER LED)
DCF DC SUPPLY FAIL INDICATION (AMBER LED)
BS BREAKER IN SERVICE POSITION (RED LED)
BT BREAKER IN TEST POSITION (CLEAR LED)
ACF AC SUPPLY FAIL INDICATION (AMBER LED)
ON ON INDICATION (RED LED)

OFF OFF INDICATION (GREEN LED)
T TRIP INDICATION (AMBER LED)
R R–PHASE INDICATION LAMP (RED LED)
Y Y–PHASE INDICATION LAMP (YELLOW LED)
B B–PHASE INDICATION LAMP (BLUE LED)
L/O/R LOCAL/OFF/REMOTE SELECTOR SWITCH
SA SURGE ARRESTER
ASS+DA DIGITAL AMMETER WITH BUILT IN SELECTOR SWITCH
VSS+DV DIGITAL VOLTMETER WITH BUILT IN SELECTOR SWITCH
415V, FIXED TYPE MOTOR PROTECTION CIRCUIT BREAKER (MPCB)
ICP INSTRUMENTATION CONTROL PANEL
N.RELAY NUMERICAL RELAY
MFM MULTI FUNCTION METER WITH RS485 COMMUNICATION (AMMETER, VOLTMETER, PF, FREQUENCY)
PLC PROGRAMMABLE LOGIC CONTROLLER

MPR COMPREHENSIVE MOTOR PROTECTION RELAY
M METERING UNIT
CAPACITOR BANK
LCSP LOCAL CONTROL STARTER PANEL
TTB(CT SHORT LINK)
SS SOFT STARTER
SD LOCAL ISOLATOR SWITCH
RC READY TO CLOSE (CLEAR LED)
LCP LOCAL CONTROL PANEL
CONTROL TRANSFORMER
TR
I/L INTER LOCK

INTERLOCK:

INCOMER-1	INCOMER-2	BUS COUPLER	DG
ON	ON	OFF	OFF
ON	OFF	ON	OFF
OFF	OFF	ON	ON
OFF	ON	ON	OFF

NOTES:

1. TRIP COIL CIRCUITS OF ALL CIRCUIT BREAKERS SHALL BE PROVIDED WITH TRIP SUPERVISION RELAY TO SUPERVISE THE CIRCUIT IN BOTH OPEN AND CLOSED POSITION OF CIRCUIT BREAKERS.
2. ALL RELAYS USED IN 11kV SWITCHGEAR SHALL BE NUMERICAL TYPE.
3. AMMETERS IN MOTOR FEEDERS SHALL BE PROVIDED WITH SUPPRESSED SCALE UP TO 6 TIMES FULL LOAD CURRENT FOR INDICATION STARTING CURRENT.
4. ACB's SHALL BE PROVIDED WITH MICROPROCESSOR RELEASES FOR ADJUSTABLE OVERLOAD SHORT CIRCUIT, UNDER VOLTAGE AND EARTH FAULT FOR LT BREAKER. VCB'S SHALL BE PROVIDED WITH SHUNT TRIP COILS RATED WITH 110V DC FOR HT BREAKER.
5. MCCB's SHALL BE PROVIDED WITH ELECTRONIC RELEASES FOR ADJUSTABLE OVERLOAD, SHORT CIRCUIT AND EARTH FAULT.
6. ALL PANEL WIRING SHALL BE WITH 1100 VOLTS GRADE PVC INSULATED 1.5 Sqmm STRANDED COPPER WIRE FOR CONTROL WIRING & 2.5 Sqmm FOR CT SECONDARY WIRING.
7. ALL CT'S SHALL BE OF 5A SECONDARY. FOR 11KV FEEDERS, SECONDARY SHALL BE 1A.
8. ALL CONTACTOR/TIMERS etc., SHALL BE RAIL MOUNTED.
9. MINIMUM CONTACTOR RATING SHALL BE 16A.
10. CONTROL SUPPLY SHALL BE 240V AC TAPPED BETWEEN PHASE AND NEUTRAL FEEDERS MODULES.
11. MPCB SHALL BE WITH IN BUILT SINGLE PHASING PREVENTER.
12. ALL CONTACTORS SHALL BE OF AC 3 DUTY.
13. WIDTH OF FEEDER COLOUMN SHALL BE MIN. 500 mm CABLE ALLEY SHALL BE 300mm MIN.
14. ALL ACB, MCCB, CONTACTORS, MPCB, & MPR SHALL BE OF TYPE–2 CO–ORDINATION.
15. LCP SHALL BE AS INDICATED IN P&ID.
16. CT RATIO SHALL BE 10% MORE THAN THE FLC 0.85PF & 0.9 EFFICIENCY.
17. CABLE COMPARTMENT SHALL HAVE LED LAMP INTERLOCKED WITH DOOR.
18. ALL INDICATION LAMP SHALL HAVE LED CLUSTER TYPE.
19. ALL MCCB SHALL HAVE EXTENDED ROTORY HANDLE & EXTENDED BUSBAR LINK
20. OPERATION LOGIC OF 415V SWITCHBOARD:

(A) AT NORMAL CONDITION BOTH THE TRANSFORMER INCOMER FEEDER SHALL BE IN CLOSED POSITION. THE BUS COUPLER AND DG INCOMER IN OPEN POSITION.

(B) IN CASE OF FAULTS, THE FAULTY INCOMER FEEDER SHALL BE OPEN POSITON THE BUS COUPLER AND THE HEALTHY INCOMER FEEDER SHALL BE CLOSED POSITON.

(C) IN CASE OF POWER FAILURE, THE DG INCOMER, BUS COUPLER SHALL BE IN CLOSED POSITION. BOTH THE TRANSFORMER INCOMER SHALL BE SWITCHED OFF BY ACTIVATION OF UNDER VOLTAGE RELAY OF THE GRID INCOMER.

21. MOTOR FEEDER <5.5kW WILL HAVE DIRECT CONNECTED AMMETER IN Y PHASE, MOTORS >5.5kW UPTO 15kW WILL BE PROVIDED WITH 1 CT AND AMMETER AND MOTOR >15kW AND ABOVE WILL BE PROVIDED WITH 3 CTS AND AMMETER.
22. NECESSARY INTERLOCK TO SPACE HEATER WITH MOTORS TO BE PROVIDED.
23. ALL MCB SHALL HAVE KW = 100% Ics.
24. ALL MCCB CONNECTED TO MOTOR SHALL BE RATED TO MOTOR DUTY.
25. ALL ACB SHALL HAVE Icu = Ics = Icw.
26. THE 415V SIDE OF THE TRANSFORMER IS PROVIDED WITH NON SEGREGATED ALUMINUM BUS DUCT IF THE TRANSFORMER RATING IS GREATER THAN OR EQUAL TO 1000KVA. FOR THE TRANSFORMER RATING IS LESS THAN 1000KVA XLPE AL ARMOUED CABLE SHALL BE PROVIDED ON 415V SIDE.
27. CABLE SIZES LESS THAN OR EQUAL TO 6 Sqmm SHALL BE PROVIDED WITH COPPER CONDUCTORS AND AL CONDUCTORS TO BE USED FOR CABLE SIZES ABOVE 6 Sqmm.
28. CAPACITOR BANK WITH APFC SHALL BE PROVIDED WITH INTERLOCK SUCH THAT PANELS ARE FED BY DG SET, CAPACITOR BANK SHALL BE DISCONNECTED.
29. 20% SPARE FEEDERS WITH MINI OF 1 SPARE FEEDER FOR EACH RATING OF THE OUTGOING FEEDERS SHALL BE PROVIDED IN LT PANELS (PCC/MCC).

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BANGALORE WATER SUPPLY AND SEWERAGE BOARD
KARNATAKA WATER SECURITY AND DISASTER RESILIENCE PROGRAMME (KWSDRP) FUNDED BY WORLD BANK

DESIGN, ENGINEERING, CONSTRUCTION AND COMMISSIONING OF WASTEWATER TREATMENT PLANT WITH TERITIARY TREATMENT FACILITY AND INTERMEDIATE SEWAGE PUMPING STATION ALONG WITH OPERATION & MAINTENANCE THEREOF FOR TEN YEARS FOR BYTARAYANAPURA ZONE (DBO Mode) IN 110 VILLAGE AREAS (PHASE II) UNDER KARNATAKA WATER SECURITY AND DISASTER RESILIENCE PROGRAM (KWSDRP) - (CONTRACT PACKAGE NO. BWSSB CE-P/KWSDRP/WBS-2A)

TITLE:
ELECTRICAL SINGLE LINE DIAGRAM FOR ELECTRICAL WORKS AT WASTE WATER TREATMENT PLANT (WWTP) WITH REUSE - TYPICAL

PROJECT MANAGEMENT CONSULTANTS:
TATA CONSULTING ENGINEERS LTD
NJS ENGINEERS INDIA PVT. LTD (JV)

DESIGNED: GVKM	APPROVED	DATE: (TO ISSUE) 02–04–2025
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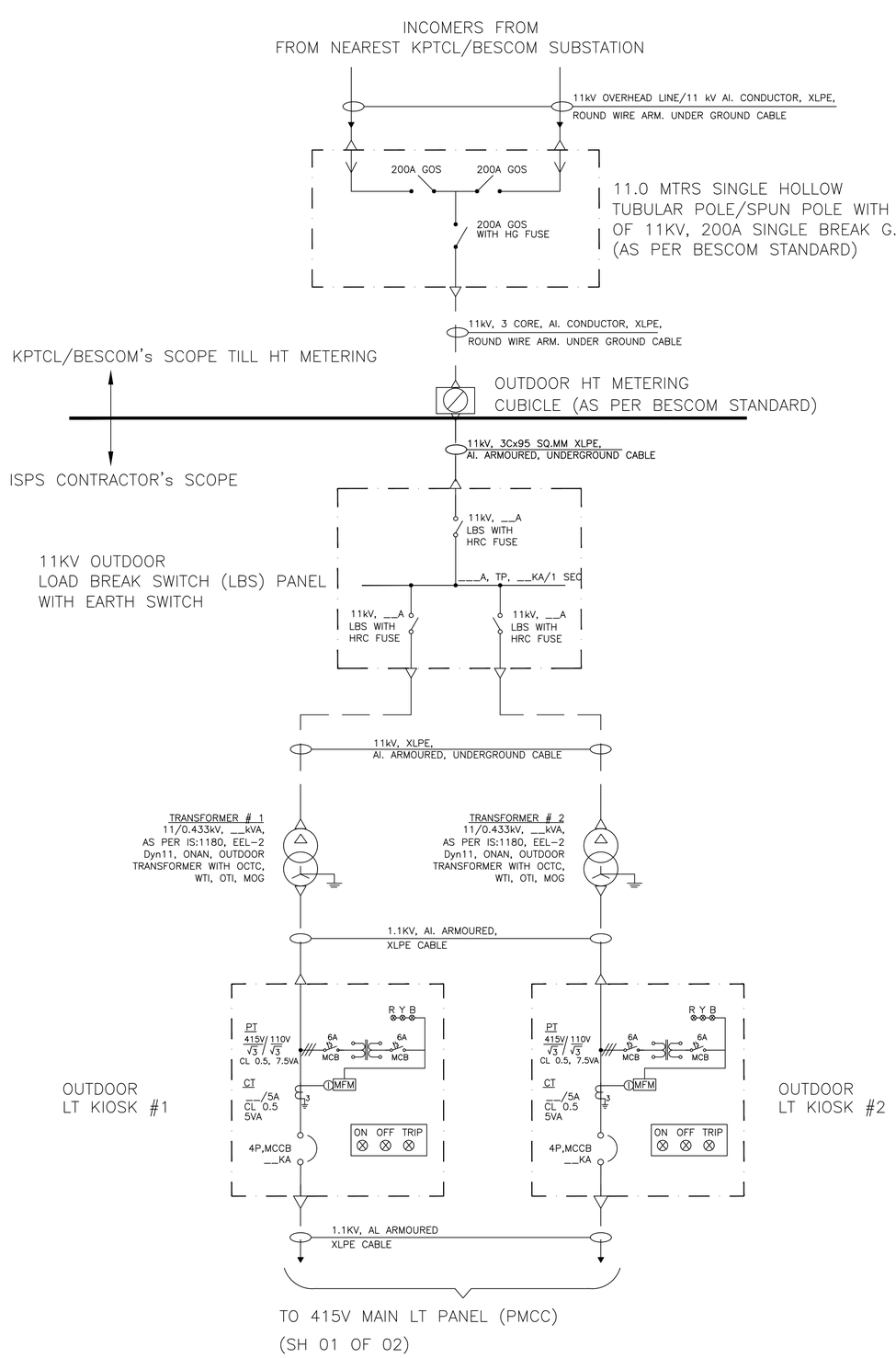
SCALE: NTS	DWG. NO. TN-KWSDRP-WBS2A-EL-4001	ISSUE: P0
FILE NAME: TN–KWSDRP–WBS2A–EL–4001.dwg		A1 SIZE

TITLE: ELECTRICAL SINGLE LINE DIAGRAM FOR THE ELECTRICAL WORKS AT ISPS (TYPICAL) SH 01 0F 02

DWG NO: TN-KWSDRP-WBS2A-EL-4002



LEGEND:

- THREE WINDING DISTRIBUTION TRANSFORMER
- CURRENT TRANSFORMER
- POTENTIAL TRANSFORMER
- CABLE TERMINATION
- INDICATING LAMPS (R – RED, Y – YELLOW, B – BLUE)
- 415V, FIXED TYPE MOULDED CASE CIRCUIT BREAKER (MCCB)
- 415V, FIXED TYPE MOTOR PROTECTION CIRCUIT BREAKER (MPCB)
- 415V, MINIATURE CIRCUIT BREAKER (MCB)
- LOAD BREAK SWITCH (LBS)
- HRC FUSE
- CAPACITOR BANKS WITH APFCR PANELS
- DIRECT-ON-LINE STARTER WITH SINGLE PHASE PREVENTOR AND BIMETALLIC RELAY
- MFM — MULTIFUNCTION METER
- M — MOTOR
- A — ANALOGUE AMMETER
- ASS — AMMETER SELECTOR SWITCH
- R — RELAY
- I — INSTRUMENTATION

NOTES:

1. AMMETERS IN MOTOR FEEDERS SHALL BE PROVIDED WITH SUPPRESSED SCALE UPTO 6 TIMES FULL LOAD CURRENT FOR INDICATION THE STARTING CURRENT.
2. MCCBs SHALL BE PROVIDED WITH ELECTRONIC RELEASES FOR OVERLOAD, SHORT CIRCUIT AND EARTH FAULT.
3. ALL CTs SHALL BE OF 5A SECONDARY.
4. ALL CONTACTOR / TIMERS ETC SHALL BE RAIL MOUNTED.
5. MINIMUM CONTACTOR RATING SHALL BE 16A.
6. ALL BMRs SHALL BE WITH INBUILT SINGLE PHASING PREVENTOR. EACH BMR SHALL BE SEPARATELY MOUNTED.
7. ALL CONTACTORS SHALL BE OF AC3 DUTY.
8. WIDTH OF FEEDER COLUMN SHALL BE MIN. 500MM AND CABLE ALLEY SHALL BE 300MM MIN.
9. ALL MOTOR PROTECTION SHALL BE OF TYPE–2 CO–ORDINATION.
10. CABLE COMPARTMENT SHALL HAVE CFL LAMP FITTING INTERLOCKED WITH DOOR.
11. ALL INDICATION LAMPS SHALL BE OF CLUSTER LED TYPE.
12. ALL MCCBs SHALL HAVE EXTENDED ROTORY HANDLE & EXTENDED BUSBAR LINK.
13. NECESSARY INTERLOCK TO SPACE HEATER WITH MOTORS TO BE PROVIDED.
14. ALL MCCBs SHALL HAVE Icu = 100% OF Ics.
15. ALL MCCBs CONNECTED TO MOTOR SHALL BE RATED TO MOTOR DUTY.
16. CONTROL VOLTAGE SHALL BE 240V AC AND SHALL BE TAPPED FROM RESPECTIVE PHASE AND NEUTRAL OF FEEDERS.

ENGINEERING REFERENCE DRAWINGS:

NIL

CONSTRUCTION REFERENCE DRAWINGS:

NIL

HOLD:

NIL

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DESIGN, ENGINEERING, CONSTRUCTION AND COMMISSIONING OF WASTEWATER TREATMENT PLANT WITH TERITIARY TREATMENT FACILITY AND INTERMEDIATE SEWAGE PUMPING STATION ALONG WITH OPERATION & MAINTENANCE THEREOF FOR TEN YEARS FOR BYTARAYANAPURA ZONE (DBO Mode) IN 110 VILLAGE AREAS (PHASE II) UNDER KARNATAKA WATER SECURITY AND DISASTER RESILIENCE PROGRAM (KWSDRP) - (CONTRACT PACKAGE NO. BWSSB CE-P/KWSDRP/WBS2A)

TITLE:
ELECTRICAL SINGLE LINE DIAGRAM
FOR THE ELECTRICAL WORKS AT ISPS (TYPICAL)
SH 01 0F 02

PROJECT MANAGEMENT CONSULTANTS:
TATA CONSULTING ENGINEERS LTD
NJS ENGINEERS INDIA PVT. LTD (JV)

DESIGNED: GVKM	APPROVED	DATE: (TO ISSUE) 02–04–2025
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FILE NAME: TN–KWSDRP–WBS2A–EL–4002.dwg		A1 SIZE

TITLE: ELECTRICAL SINGLE LINE DIAGRAM FOR THE ELECTRICAL WORKS AT ISPS (TYPICAL) SH 02 0F 02

DWG NO: TN-KWSDRP-WBS2A-EL-4002

FROM LT KISOK–1 OF REF. DWG. NO. (SH 01 OF 02)

FROM LT KISOK–2 OF REF. DWG. NO. (SH 01 OF 02)

415V, __kVA D.G SET WITH AMF PANEL

415V MAIN LT PANEL (PMCC)

LOC: ELECTRICAL ROOM

1.1kV, Al, ARMOURED, XLPE CABLE (TYP)

PT 415V/√3 / 110V/√3 CL 0.5, 20VA

CT ---/5A CL 0.5 5VA

---/5A 5P10 5VA

6A MCB

R Y B

VSS V

MFM ASS A

APFCR

INCOMER–1 MCCB,4P

INCOMER–2 MCCB,4P

INCOMER–3 MCCB,4P

ON MCCB FEEDER

ON OFF TRIP

INTERLOCK

BUS–COUPLER MCCB,4P

415V, ---A, 3Ph, TPN, 50Hz, __kA/1 SEC, AL. BUSBAR–I

415V, ---A, 3Ph, TPN, 50Hz, __kA/1 SEC, AL. BUSBAR–II

MCCB TPN

MCB TP

MCCB 4P

Y–D STARTER

DOL STARTER

HOIST JB 5 TON

HOIST JB 2 TON

SCREEN PANEL

32A, 4P MCCB+RCCB (30 mA) 3 PHASE PLUG+SOCKET

MOV DB

INDOOR LDB

PDB

SPARE (2 NOS.)

SPARE

GRIT REMOVAL PUMP

STREET LIGHTING DB

DEWATERING PUMPS

-- kVAR APFC PANEL–1

-- kVAR APFC PANEL–2

VFD PANEL–1

VFD

PMU LCS

SUBMERSIBLE MOTOR JUNCTION BOX–3

SOFT STARTER PANEL–1

IP 54 BOTTOM ENTRY

MCCB TP

---/5A CL. 0.5 5VA

SS SOFT STARTER

SUBMERSIBLE MOTOR JUNCTION BOX–1

SOFT STARTER PANEL– 2

SUBMERSIBLE MOTOR JUNCTION BOX–2

NOTES:

BUS TRANSFER ARRANGEMENT BETWEEN I/Cs, B/C & DG I/C ARE DESCRIBED AS BELOW.

A	B	C	D
INCOMER–1	BUS–COUPLER	INCOMER–2	INCOMER–3
ON	OFF	ON	OFF
OFF	ON	ON	OFF
ON	ON	OFF	OFF
OFF	ON	OFF	ON

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TITLE: ELECTRICAL SINGLE LINE DIAGRAM FOR THE ELECTRICAL WORKS AT ISPS (TYPICAL) SH 02 0F 02

PROJECT MANAGEMENT CONSULTANTS:
TATA CONSULTING ENGINEERS LTD
NJS ENGINEERS INDIA PVT. LTD (JV)

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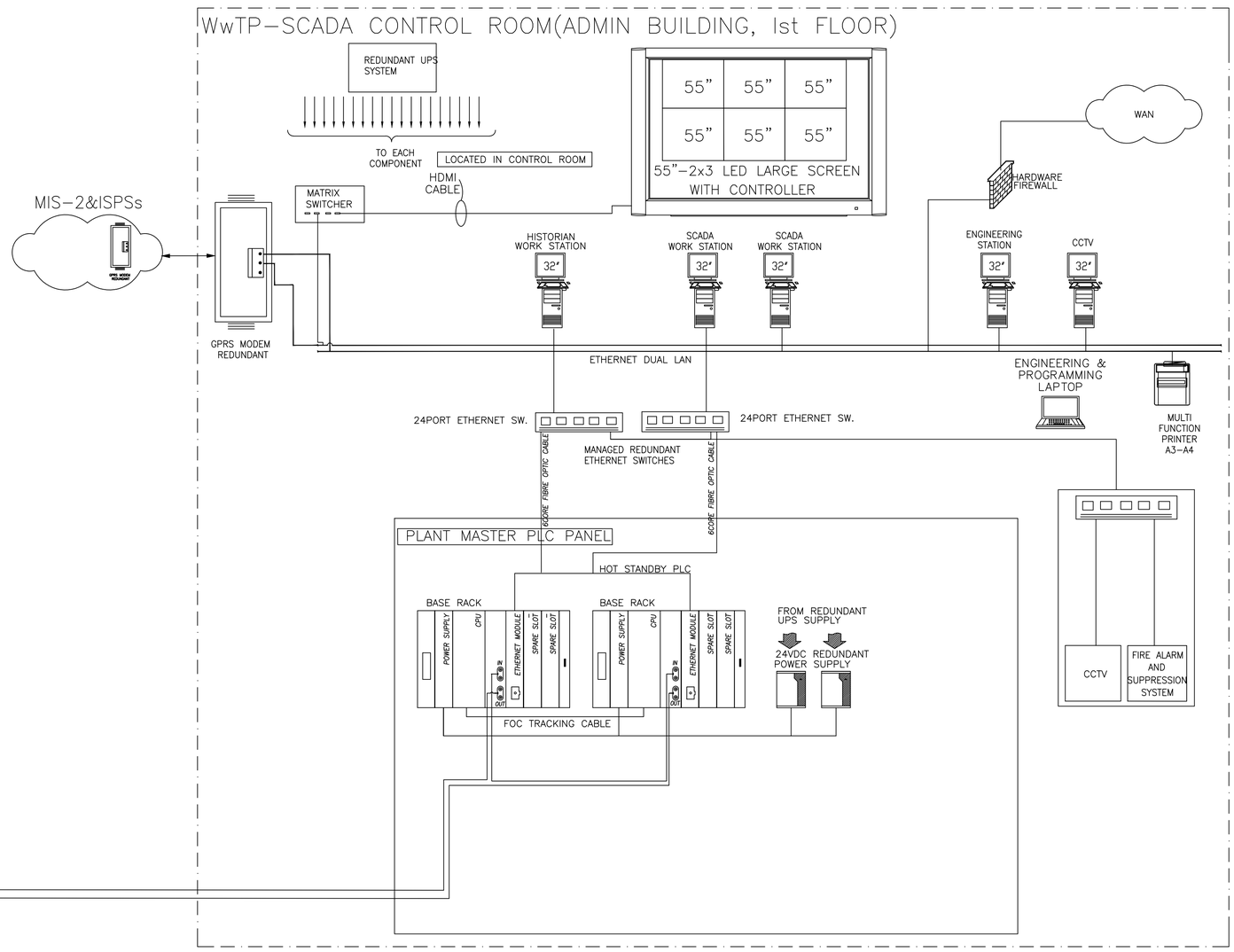
FILE NAME: TN–KWSDRP–WBS2A–EL–4002.dwg A1 SIZE

TITLE:	DWG NO:
SCADA CONTROL SYSTEM ARCHITECTURE DRAWING FOR WWTP AT KOGILU	TN-KWSDRP-WBS2A-IC-5002



LEGEND:–

S.No.	SYMBOL	DESCRIPTION
1.	PLC	PROGRAMMABLE LOGIC CONTROLLER
2.	———	ETHERNET CABLE
3.	–·–·–·–	MODBUS RS485 CABLE
4.	═══	SINGLE MODE OPTICAL FIBER CABLE (OFC)–REDUNDANT MODE
5.	═══	SIGNAL CABLE
6.	———	HDMI CABLE
7.	SCADA	SUPERVISORY CONTROL AND DATA AQUISITION
8.	HMI	HUMAN MACHINE INTERFACE
9.	CCTV	CLOSED CIRCUIT TELEVISION
10.	CPU	CENTRAL PROCESSING UNIT
11.	UPS	UNINTERRUPTIBLE POWER SUPPLY
12.	WAN	WIDE AREA NETWORK
13.	LAN	LOCAL AREA NETWORK
14.	ODU	OUT DOOR DISPLAY UNIT
15.	OARM	ONLINE ANALYTICAL REAL TIME MULTIPARAMETERS
16.	KSPCB	KARNATAKA STATE POLLUTION CONTROL BOARD

NOTES:–

1. PLANT MASTER PLC SHALL BE HOT–STAND–BY CONFIGURATION[REDUNDANT CONTROLLERS, POWER SUPPLY & COMMUNICATION MODULES]
2. SCADA CONTROL ROOM SHALL BE LOCATED AT 1ST FLOOR OF ADMIN BUILDING.
3. REDUNDANT SCADA SERVERS SHALL BE CONFIGURED WITH HOTSTAND–BY CONTROLLERS
4. HISTORIAN SERVER (BLADE TYPE) SHALL BE CONFIGURED WITH SCADA SERVER AND THE SAME SHALL BE UTILIZED THROUGH HISTORIAN OPERATOR WORKSTATION FOR CONTINUOUS BACKUP & RETRIEVAL OF SCADA SERVER DATA
5. ALL RIO PANELS SHALL BE CONFIGURED THROUGH PLANT HOTSTAND–BY CONTROLLER THROUGH REDUNDANT OPTICAL FIBRE CABLE (OFC) UNDER RING NETWROK TOPOLOGY.
6. THE INPUT & OUTPUT (ANALOG / DIGITAL) MODULES SHALL BE AS REQUIRED SUBJECT TO APPROVED INPUT & OUTPUT(IO) SCHEDULE.
7. THE SPARE PHILOSOPHY FOR INPUT & OUTPUT (ANALOG/ DIGTAL) SHALL BE CONSIDERED AS 30% WHICH INCLUDES PANEL ACCESSERIES OF POTENTIAL FREE CONTACTS & TERMINAL BLOCKS– APPLICABLE FOR RIO PANELS AS WELL AS ANY SUB PROCESS SYSTEMS OF VENDOR PACKAGE PLC PANELS.
8. THE SPARE MEMORY FOR CONROLLERS SHALL BE 50% SPARE AS PROGRAM MEMORY AND DATA MEMORY
9. MULTI FUNCTION ENERGY METERS (MFMs) SHALL BE CONNECTED TO RESPECTIVE RIO PANEL THROUGH RS–485 CONNECTIVITY
10. FIRE ALARM SYSTEM & CLOSE CIRCUIT TELEVISION SYSTEMS SHALL BE INTERFACED WITH PLANT SCADA SYSTEMS.
11. 15" INCHES PANEL MOUNTED HMIs SHALL BE CONSIDERED FOR EACH RIO PANEL AND 10" INCHES PANEL MOUNTED HMIS SHALL BE CONSIDERED IN CASE OF ANY SUB PROCESS SYSTEMS OF VENDOR PACKAGE CONTROL SYSTEM
12. LARGE VIDEO SCREEN (55" led 2 X3 DISPLAY ARRAY) WITH REQUIRED CONTROLLER AND SOFTWARE FOR SCREEN SPLITTING BETWEEN VARIOUS LED ARRAY SCREENS WITH SCADA & CCTV SYSTEM FOR LIVE MONITORING OF SCADA & CCTV FEEDS. OPERATOR CAN ALSO BE ABLE TO CHANGE PLANT SCADA SCREENS IN LED ARRAYS AS PER HIS CONVINIENT WITH RESPECT TO BETTER OPERATIONAL POINT OF VIEW.
13. PLANT BULK DATA [COMPLETE PLANT OPERATIONAL DATA INCLUSIVE OF LAB DATA THROUGH LIMS] TO BE TRANSMITTED TO MIS–2 CENTRAL SCADA SYSTEM AT SHIMSHA BHAVAN THROUGH REDUNDANT GPRS COMMUNICATION MODULES THROUGH INTERFACE PANEL.
14. ONLINE ANALYTICAL REALTIME MULTIPARAMETER SHALL BE CONSIDERED FOR INLET & OUTLET OF WwTP AND THOSE READINGS TRANSMITTED TO KSPCB AS WELL AS PLANT SCADA SYSTEM.
15. THE VENDOR PLCs DATA SHALL BE INTERFACED WITH PLC / SCADA SYSTEM BY USING SERIAL COMMUNICATION FOR THE PURPOSE OF CONTINUOUS MONITORING & CONTROL.
16. .The RIO Panel shall be applicable for any non–SBR Packages (i.e. Vendor Package PLC applicable for SBR Package)

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BANGALORE WATER SUPPLY AND SEWERAGE BOARD
KARNATAKA WATER SECURITY AND DISASTER RESILIENCE PROGRAMME (KWSDRP) FUNDED BY WORLD BANK

DESIGN, ENGINEERING, CONSTRUCTION AND COMMISSIONING OF WASTEWATER TREATMENT PLANT WITH TERITIARY TREATMENT FACILITY AND INTERMEDIATE SEWAGE PUMPING STATION ALONG WITH OPERATION & MAINTENANCE THEREOF FOR TEN YEARS FOR BYTARAYANAPURA ZONE (DBO Mode) IN 110 VILLAGE AREAS (PHASE II) UNDER KARNATAKA WATER SECURITY AND DISASTER RESILIENCE PROGRAM (KWSDRP) - (CONTRACT PACKAGE NO. BWSSB CE-PKWSDRPWBS-2-A)

TITLE:

SCADA CONTROL SYSTEM ARCHITECTURE DRAWING FOR WwTP AT KOGILU

PROJECT MANAGEMENT CONSULTANTS:
TATA CONSULTING ENGINEERS LTD
NJS ENGINEERS INDIA PVT. LTD (JV)

DESIGNED: MR	APPROVED	DATE: (TO ISSUE) 02/04/2025
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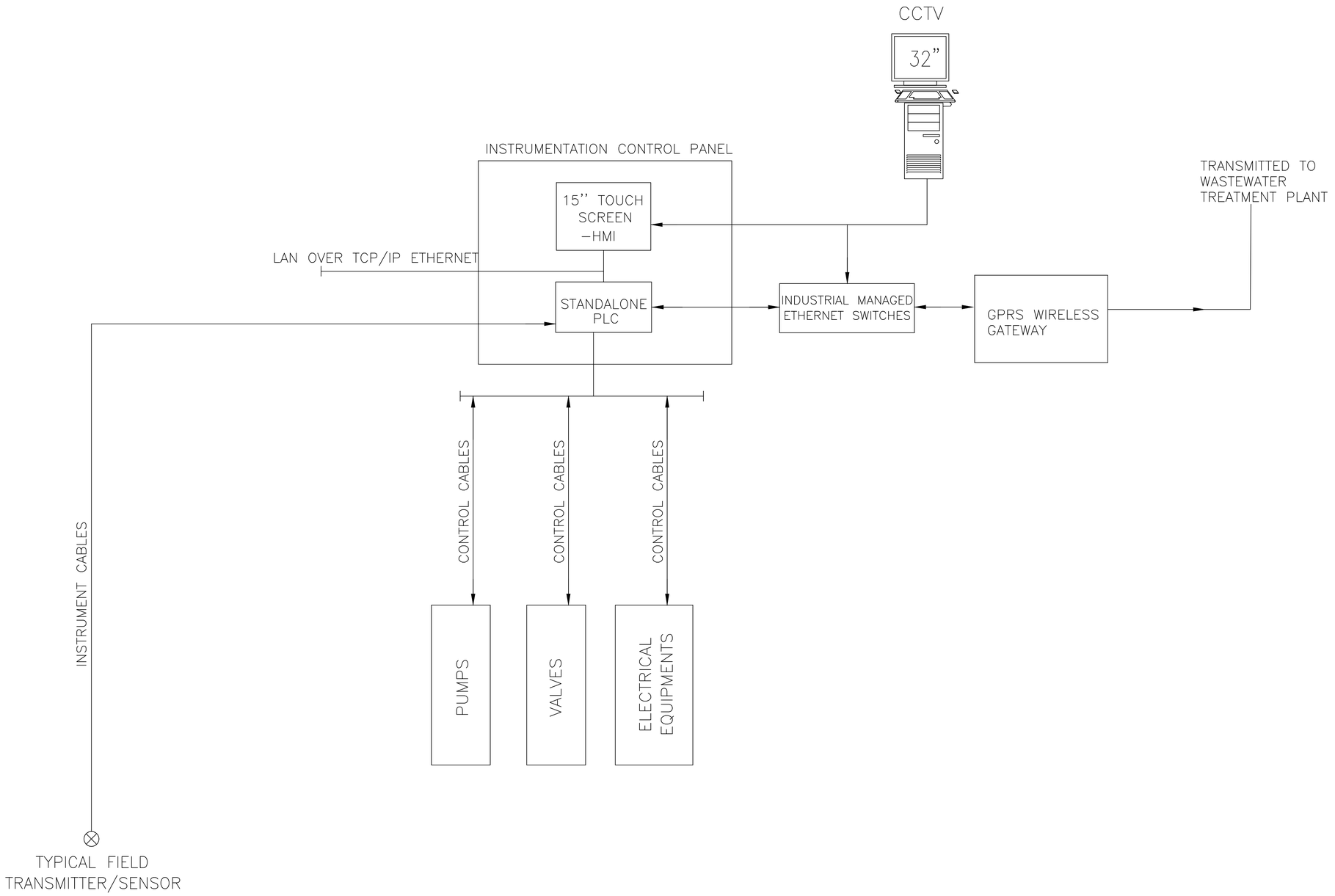
FILE NAME: 10. TN–KWSDRP–WBS2A–IC–5002.dwg		A1 SIZE

TITLE: CONTROL SYSTEM ARCHITECTURE DRAWING FOR INTERMEDIATE SEWAGE PUMPING STATION (ISPS) AT BELLALAHALLI/HAROHALLI

DWG NO: TN-KWSDRP-WBS2A-IC-5010



LEGENDS :

PLC – PROGRAMMABLE LOGIC CONTROLLER
GPRS – GENERAL PACKET RADIO SERVICE
ISPS – INTERMEDIATE SEWAGE PUMPING STATION

HMI – HUMAN MACHINE INTERFACE

NOTES :

1. The PLC shall be Standalone configuration installed under Internal Wiring Instrumentation Control Panel embedded with 15'' Panel Mounted Touch Screen HMI.
2. The ISPS PLC Data shall be integrated to respective STP for continuous monitoring by using GPRS wireless communication system.
3. The PLC/HMI System shall be proposed at Intermediate Sewage Pumping Station (ISPS) for the purpose of Automatic Operational requirement pertaining to Pumps sequence of Operation subject to Step Logic Level Control including all protection Interlocks.
4. The UPS system shall be applicable for back–up power supply requirement for entire Instrumentation, Control & Automation (ICA) equipment.

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KARNATAKA WATER SECURITY AND DISASTER RESILIENCE PROGRAMME (KWSDRP) FUNDED BY WORLD BANK

DESIGN, ENGINEERING, CONSTRUCTION AND COMMISSIONING OF WASTEWATER TREATMENT PLANT WITH TERITIARY TREATMENT FACILITY AND INTERMEDIATE SEWAGE PUMPING STATION ALONG WITH OPERATION & MAINTENANCE THEREOF FOR TEN YEARS FOR BYTARAYANAPURA ZONE (DBO Mode) IN 110 VILLAGE AREAS (PHASE II) UNDER KARNATAKA WATER SECURITY AND DISASTER RESILIENCE PROGRAM (KWSDRP) - (CONTRACT PACKAGE NO. BWSSB CE-P/KWSDRP/WBS-2A)

TITLE:
CONTROL SYSTEM ARCHITECTURE DRAWING FOR INTERMEDIATE SEWAGE PUMPING STATION (ISPS) AT BELLALAHALLI/HAROHALLI

PROJECT MANAGEMENT CONSULTANTS:
TATA CONSULTING ENGINEERS LTD
NJS ENGINEERS INDIA PVT. LTD (JV)

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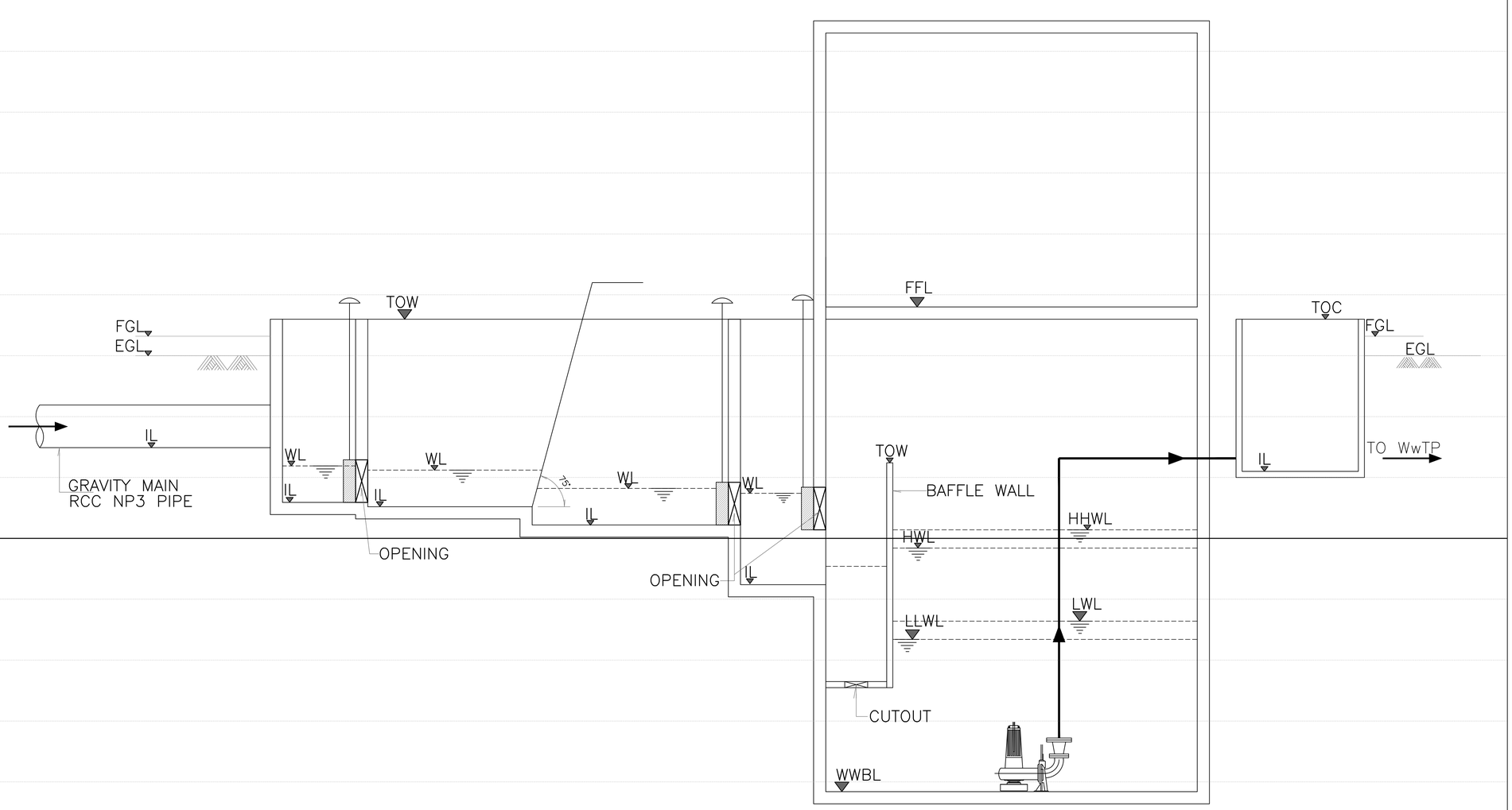
FILE NAME: 11. TN–KWSDRP–WBS2A–IC–5010.dwg		A1 SIZE

TITLE: TYPICAL HYDRAULIC FLOW DIAGRAM FOR INTERMEDIATE SEWAGE PUMPING STATION

DWG NO: TN/KWSDRP/WBS2A/HFD/6011



HYDRAULIC FLOW DIAGRAM

LEGENDS :

IL – INVERT LEVEL
WL – WATER LEVEL
EGL – EXISTING GROUND LEVEL
FFL – FINISHED FLOOR LEVEL
FGL – FINISHED GROUND LEVEL
TOW – TOP OF WALL
HWL – HIGH WATER LEVEL
HHWL– HIGH HIGH WATER LEVEL
LWL – LOW WATER LEVEL
LLWL– LOW LOW WATER LEVEL
RCC – REINFORCED CEMENT CONCRETE
WWBL– WET WELL BOTTOM LEVEL
ISPS – INTERMEDIATE SEWAGE PUMPING STATION

NOTE :

1. ALL LEVELS SHALL BE DETERMINED BY THE BIDDER BASED ON SITE SURVEY DETAILS BASED ON THE PROPOSED ISPS

ENGINEERING REFERENCE DRAWINGS :

–NIL–

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BANGALORE WATER SUPPLY AND SEWERAGE BOARD
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TITLE: TYPICAL HYDRAULIC FLOW DIAGRAM FOR INTERMEDIATE SEWAGE PUMPING STATION

PROJECT MANAGEMENT CONSULTANTS:
TATA CONSULTING ENGINEERS LTD
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FILE NAME: TN–KWSDRP–WBS2A–HFD–6011.dwg A1 SIZE